

**CRYSTAL-FIELD-DRIVEN REDOX REACTIONS: HOW COMMON  
MINERALS SPLIT  $H_2O$  AND  $CO_2$  INTO REDUCED  $H_2$  AND C  
PLUS OXYGEN**

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It is difficult to prove the presence of molecular  $H_2$  and reduced C in minerals containing dissolved  $H_2$  and  $CO_2$ . We developed a new technique by which we can unambiguously show that minerals grown in viciously reducing environments contain peroxy in their crystal structures. These peroxy represent interstitial oxygen atoms left behind when the solute  $H_2O$  and/or  $CO_2$  split off  $H_2$  and C as a result of internal redox reactions, driven by the crystal field. The observation of peroxy affirms the presence of  $H_2$  and reduced C. It shows that the solid state is indeed an unusual reaction medium.